"The pattern of Intra cranial hemorrhage in the age group of 2 weeks and 6 months with reference to late onset Hemorrhagic Disease of Newborn"

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HOSPITAL FOR CHILDREN
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CERTIFICATE

This is to certify that the dissertation titled **"The pattern of intra cranial hemorrhage in the age group of 2 weeks and 6 months with reference to late onset Hemorrhagic Disease of Newborn"** submitted by Dr.S.Ramkumar to the Faculty of Paediatrics, The Tamilnadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.D. Degree (Paediatrics) is a bonafide research work carried out by him under our direct supervision and guidance.

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This is submitted to **The Tamilnadu Dr. M.G.R. Medical University, Chennai** in partial fulfillment of the rules and regulations for the M.D. Degree Examination in Pediatrics.

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INTRODUCTION

Hemorrhagic Disease of Newborn(HDN) also called Vitamin K Deficiency Bleeding (VKDB) is a major cause of hemorrhage in newborn and young infants. Haemorrhagic disease of the newborn, first identified over a hundred years ago by Townsend[1], presents as unexpected bleeding in neonates, often with gastrointestinal hemorrhage, ecchymosis and, in many cases, intracranial hemorrhage as a result of deficiency of vitamin K.

Vitamin K:

Vitamin K is a fat soluble vitamin that can be absorbed from the GI tract in the presence of bile salts. Vitamin K is required for the production of coagulation factors II, VII, IX and X in the liver. Because of the short half life of these factors, and the small amounts of vitamin K that can be stored in the body, inadequate intake of vitamin K can result in deficiency in a short period of time. Potein induced in vitamin K absence or antagonism(PIVKA), inactive precursor proteins induced in vitamin K's absence, are measurable and can be used as an indicator of vitamin K deficiency.

Pathophysiology:

Newborns are relatively vitamin K deficient for a variety of reasons. Factors that can contribute to this deficiency include.

- Low vitamin K stores at birth

- Poor placental transfer of vitamin K,
- Low levels of vitamin K in breast milk (15µg/dL compared to cow's milk 60µg/dl) and
- Sterility of gut.

Because standard commercial infant formulas contain supplemental vitamin K, HDN is almost exclusively a problem of breastfed infants. The most common site of bleeding are the umbilicus, mucous membranes, GI tract, circumcision, and venipunctures. Intracranial bleeding can occur and is the main cause of mortality and long term morbidity.

Types of vitamin K deficiency:

VKDB can occur in 3 general time frames.

- Early onset, at less than 24 hours after birth, rarely occurs and is almost always associated with maternal mediations that interfere with vitamin K, such as anticonvulsants, anticoagulants and antibiotics.
- Classic onset of VKDB occurs 2 -7 days after birth in breast fed infants
- Late onset VKDB occurs after 2 weeks of life. In addition to breastfeeding, risk factors include diarrhea, hepatitis, cystic fibrosis(CF), celiac disease, and alpha 1 antitrypsin deficiency or absence of prophylaxis in otherwise healthy infants

In 1961, the American Academy of Pediatrics recommended that 0.5 to 1 mg of

vitamin K be administered intramuscularly to all newborns shortly after birth to prevent this problem[2]. This recommendation occurred before the issue of a potential relationship between intramuscular vitamin K and childhood cancer was raised and subsequently shown to be invalid. In 1988, the Canadian Pediatric Society (CPS) indicated that the oral administration of 2 mg of vitamin K within six hours of birth was an acceptable alternative[3]. Several other countries similarly recommended the alternative oral route.

Subsequently, late HDNB occurring between three to eight weeks of age almost exclusively among breast-fed infants, began to emerge as a serious concern in many western countries. At four to six weeks of age, biochemical signs of vitamin K deficiency were evident in 19% of infants given 2 mg of vitamin K orally at birth compared to 5.5% of infants given a 1 mg dose intramuscularly.

In 1997, the CPS[4] revised recommendations to go for a single intramuscular dose of 0.5 mg (birthweight 1500 g or less) or 1 mg (birthweight greater than 1500 g) should be given to all newborns within the first six hours of life.While articles recommending continued use of oral vitamin K following birth continued to be published, the ideal dose, timing and formulation are not clear for oral prophylaxis and varied throughout.

Late onset VKDB(Late HDN) tends to be more severe than early onset or classic disease and has a high frequency of intracranial hemorrhage. Although it is said that incidence of HDN has decreased by prophylactic administration of vitamin K, young infants with late HDN resulting from vitamin K deficiency still exist. Late HDN occurs predominantly in exclusively breastfed infants, but may also occur in babies with malabsorption, lack of vitamin K administration at birth, chronic diarrhea, and

prolonged use of antibiotics. Late HDN produces the greatest morbidity and mortality amongst the infants due to sudden bleeding into the CNS.

Incidence of Late HDN in the eastern world is 25-80/1 00 000 births which is higher than that in the western world (4-25/100000)[5]. Almost 2/3rd of the babies with late HDN present with serious intracranial bleeds leading to high morbidity and subsequent mortality.

Clinical features:

The findings from the physical examination are normal except for findings at the sites of bleeding.

Lab studies:

Include prothrombin time (PT), activated partial thromboplastin time (aPTT), fibrinogen levels, and a platelet count in the initial workup for bleeding in a newborn. A thrombin clotting time is optional.

- A prolonged PT usually is the first laboratory test result to be abnormal in VKDB; however, no laboratory test can confirm the diagnosis of VKDB.
- Vitamin K direct assay is not useful because levels normally are low in newborns.
- Levels of protein induced by vitamin K antagonism (PIVKA) II are increased in VKDB, but this test generally is not available other than research laboratories.
- Infants with VKDB typically have a prolonged PT with reference range platelet

counts and fibrinogen levels.

The diagnosis of VKDB is confirmed if administration of vitamin K brings a halt to the bleeding and reduces the PT value.

Imaging Studies:

Intracranial bleeding is rare and usually associated with other causes of bleeding, particularly the thrombocytopenias; however, ICH has been reported in VKDB and can be fatal[5]. Investigate any neurologic symptoms with a CT scan.

Medical Care:

Prevention of VKDB with intramuscular vitamin K is of primary importance in medical care. A single dose of intramuscular vitamin K after birth effectively prevents classic VKDB. While oral vitamin K prophylaxis improves coagulation tests at 1-7 days, it has not been tested in randomized trials for its effect on either classic or late VKDB.

- Immediately administer vitamin K subcutaneously for any infant in whom VKDB is suspected or who has any sort of bleeding until a diagnosis is established.
    - Intramuscular administration can result in a hematoma because of the coagulopathy.
    - Intravenous administration of vitamin K has been associated with anaphylactoid reactions.

- Fresh frozen plasma may be considered for moderate-to-severe bleeding.
    - Life-threatening bleeding may also be treated with prothrombin complex concentrates (PCC).
    - Because the bleeding in classic VKDB usually is not life threatening, a single dose of parenteral vitamin K is sufficient to stop the bleeding and return PT values to the reference range.

Prevention:

In the early 1990s, an association between parenteral vitamin K and the later occurrence of childhood cancer was reported; however, a large cohort study and a large retrospective analysis of a database in the United States could not confirm this association. Because this association is weak at best, routine vitamin K prophylaxis is recommended and supported by the American Academy of Pediatrics.

- Oral vitamin K has been studied as an alternative and can improve clotting studies and vitamin K levels, but it has not been studied in large randomized controlled trials to determine if an oral prevention strategy is effective at preventing early and late VKDB.

REVIEW OF LITERATURE

I] Puneet A. Pooni conducted a study to evaluate the clinical profile and outcome in late hemorrhagic disease of the newborn (HDN) with particular reference to intracranial hemorrhage.

1) Infants (n = 42) presenting with late HDN from January 1998 to December 2001 were studied. Majority (76%) were in the age group of 1-3 months.

2) All were term babies on exclusive breast-feeding and none received vitamin K at birth.

3) 71% patients presented with intracranial hemorrhage, commonest site being intracerebral and multiple ICH. Visible external bleeding was noted in 1/3rd of patients only. Three patients expired

4) Late HDN is still an important cause of mortality and morbidity in developing countries where vitamin K prophylaxis is not routinely practiced. Isolated intracranial hemorrhage is a common mode of presentation.

A neonate fulfilling the following criteria was defined as having late HDN:

(i) bleeding in an infant after 7 days of life,

(ii) no thrombocytopenia (platelet counts >1.5 lac/mm^3),

(iii) normal peripheral blood smear examination,

(iv) prolonged prothrombin time index (PTI) (INR >1.8), and rapid correction of PTI or cessation of bleeding after vitamin K administration.

Exclusion criteria:

Infants with presence of icterus, significant hepatomegaly and / or derangement of liver enzymes and failure of PT to return to normal after a single dose of vitamin k were considered to have liver disease and excluded.[6]

Limitations of this study are that the prevalence of late HDN in infants who received vitamin K is not available and whether vitamin k administration at birth prevents late HDN or not could not be understood.

II) Shirahata A et al_conducted a sudy in Japan in 121 instiutes between July 1998 to June 2001.

a. 15 cases were definitely diagnosed as vitamin K deficiency according to our criterion.

b. The diagnostic criterion of vitamin K deficiency was as follows: (i) Hepaprastin test <10%; (ii) increase of protein induced in vitamin K absence-II (PIVKA-II); and (iii) improvement of abnormal coagulation test values after vitamin K administration. The case that filled more than one of the mentioned three items was diagnosed as vitamin K deficiency.

c. early onset type and classical type vitamin K deficiency was the patient who had no history of vitamin K administration.

d. Among late onset type cases, every patient had received some dose of vitamin K with various methods before the onset of the hemorrhagic disease.[8]

Limitations:

1. only 15 cases over a follow up of 3 years

2. diagnostic criteria requires more than one items

III) I.E. D'Souza conducted a study in 2003 in clinical profile of late HDN

- 14 infants diagnosed with late hemorrhagic disease of newborn (LHDN), of which 10 did not receive vitamin K prophylaxis, are presented.

- All infants were exclusively breast-fed and 12 did not have any underlying illness to explain the abnormal coagulation profile.

Any infant less than 6 months' old presenting with hemorrhage without any evidence of infection and having a normal platelet count, pro-longed prothrombin time (PT) and activated partial thromboblastin time (APTT), which normalized within 12 to 24 hours after administering vitamin K, was considered to have late HDN.

1. Of 14 infants diagnosed to have late HDN, 8 were boys. Eight were born in the hospital of which 4 received intramuscular vitamin K.

2. All 14 infants were exclusively breast-fed.

3. The age at presentation ranged between 1 and 3 months.

4. Eight patients, including 5 who were discharged against medical advice, died (57%); 6 patients were discharged, of which 5 (36%) had neuro-logical sequelae and only one was well

5. Vitamin K prophylaxis should be offered to all newborns who are exclusively breast-fed.[7]

STUDY JUSTIFICATION

The analysis of data collected for a period of 2 1/2 years (Jan 2005 –Jun 2007) shows that the total number of cases of intracranial bleeding diagnosed in our Institute are 116, of which 61 cases are in the age group of 2 weeks to 6 months (see table 3 & 4). Hemorrhagic disease of newborn(HDN) diagnosed during this period are 75, of which 61 constituted both classical and early HDN and only 14 cases belonged to the late onset HDN.

This is an underestimate as many cases could not have been evaluated properly as these infants presented with intra cranial bleeding which is a medical emergency and life threatening problem. More over young infants with intracranial bleeding may present at any time and work up for bleeding diathesis were not available at all times. In such situation, cases were managed rather than waiting for diagnosis. Work up for bleeding diathesis after the administration of blood products did not contribute to the etiological diagnosis.

All the young infants are admitted with intracranial hemorrhage without obvious cause,e.g., trauma, liver disease, cholestasis, previous bleeding diathesis, or family history of bleeding diathesis.

Many cases could not be followed up as intra cranial bleeding had a high mortality. Follow up of some of these cases did not reveal any abnormal coagulation profile. This suggests that the coagulopathy resulting in intracranial bleeding is a transient one. Late HDN causes a transient vitamin K deficiency yet life threatening.

Late HDN was considered the possible diagnosis in these young infants. So this study was carried out to know the real magnitude of Late HDN in causing intra cranial hemorrhage in these infants.

AIM

To study the pattern of

a. Intra cranial hemorrhage among infants in the age group of 2 weeks and 6 months

b. Late HDN among the cases presenting with intra cranial hemorrhage

At INSTITUTE OF CHILD HEALTH and HOSPITAL for CHILDREN, Chennai.

SUBJECTS AND METHODS

METHODOLOGY:

DESIGN OF STUDY : Descriptive study

PLACE OF STUDY : PICU, NICU, medical wards and newborn ward in Institute of Child Health and Hospital for Children, Egmore, Chennai-8

PERIOD OF STUDY : Dec 2007 – JUNE 2009

STUDY POPULATION:

Children evaluated and diagnosed as having intracranial hemorrhage in the age group of 2 weeks to 6 months

SAMPLE SELECTION:

INCLUSION CRITERIA:

Children admitted as suspected case of intra cranial hemorrhage in the age group of 2 weeks to months

EXCLUSION CRITERIA:

Children for whom intra cranial hemorrhage could not be documented by ULTRASONOGRAM or CT BRAIN were excluded

MANOEUVRE:

This prospective study evaluates children admitted as intracranial hemorrhage for the pattern of presentation, etiology, and proportional morbidity due to Late HDN.

Children admitted in the age group of 2 weeks to 6 months with suspected intra cranial bleeding (ref: table 1) are included in the study. Ultra sound or computed tomography of cranium was done to confirm the diagnosis of intra cranial bleed. After appropriate history and clinical examination, details were entered in the proforma. All the cases were worked up for bleeding diathesis. For all children, platelet count, peripheral smear, prothrombin time (PT) and activated partial thromboplastin time (APTT) were done. Further work up for aetiological diagnosis was done based on the above results by following standard protocols (ref: table 4). If both PT and APTT were prolonged, prothrombin time is repeated after administering vitamin K (2.5mg < 1month, 5 mg >1 month).

Cases were diagnosed as late onset HDN if following criteria were fulfilled

1. platelet count was normal, 2. Peripheral smear was normal, 3. both PT and APTT were prolonged, and 4. PT normalized after vitamin K administration.

Clinical profile of cases presenting as late HDN were analyzed.

OUTCOME MEASUREMENT:

Various causes of intra cranial bleed in this age group, causes of Late HDN, risk factors for late HDN, and clinical profile of late HDN

STATISTICAL ANALYSIS:

Proportions of various outcome measures in the form of percentages as applicable and tabulated.

RESULTS

Total number of intra cranial bleeding diagnosed in this Institute during the study period from birth to 12 years -119.

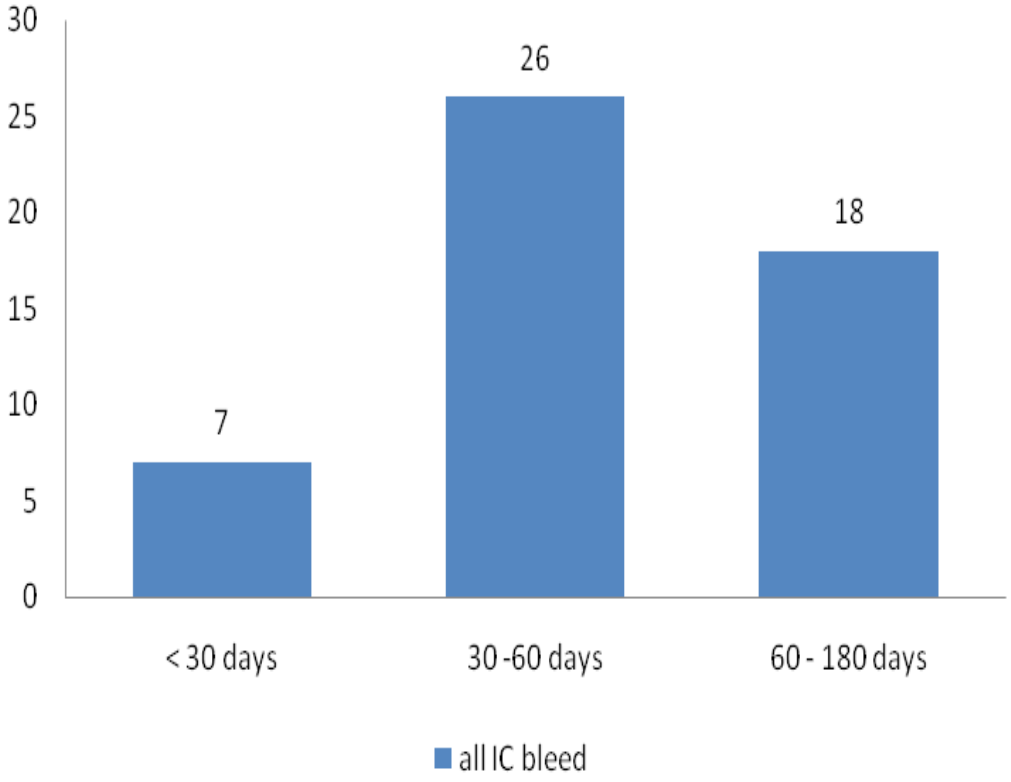
Total number of cases in the age group of 2 weeks to 6 months – 51(42.8%).

Total number of late onset HDN – 16(31.3%)

S No.	Diagnosis	Total cases
1.	Late HDN idiopathic	15
2.	Neonatal Cholestasis	8
3.	Late HDN – Diarrhoea/antibiotic usage	1
4.	Head injury	2
5.	Viral hemorrhagic fever/Thrombocytopenia	3
6.	Dengue hemorrhagic fever/Thrombocytopenia	1
7	Hemophilia A	1
8	Hypofibringenemia	1
9	Dysfibrinogenemia	1
10	Hemorrhagic meningoencephalitis	1
11	Sepsis/DIC	1
12	Undiagnosed	16

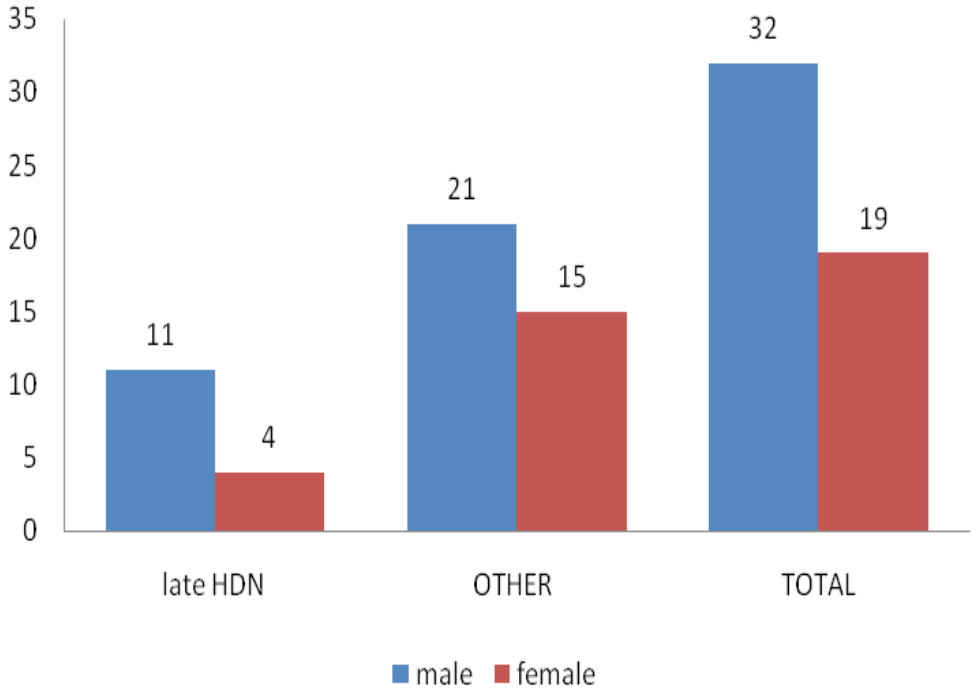
Age of presentation:

Among the cases presented with intracranial bleeding, the common age group of presentation were 1 month to 2 months (26 cases – 50.8%).



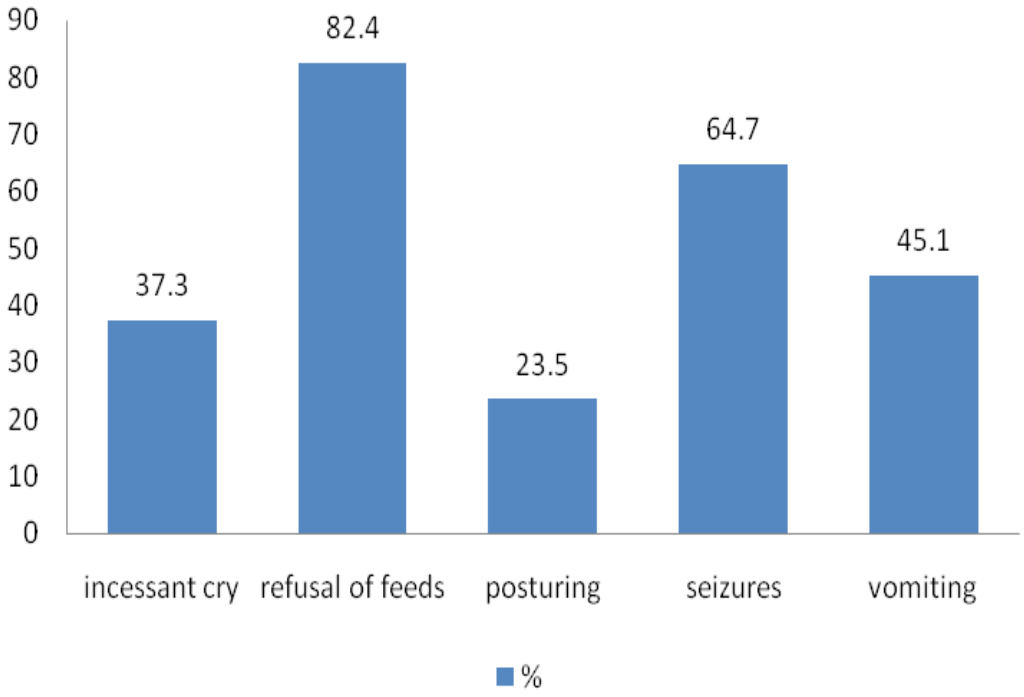
Sex:

Male infants constituted a significant number(62.1%) of cases presenting with intracranial bleed.



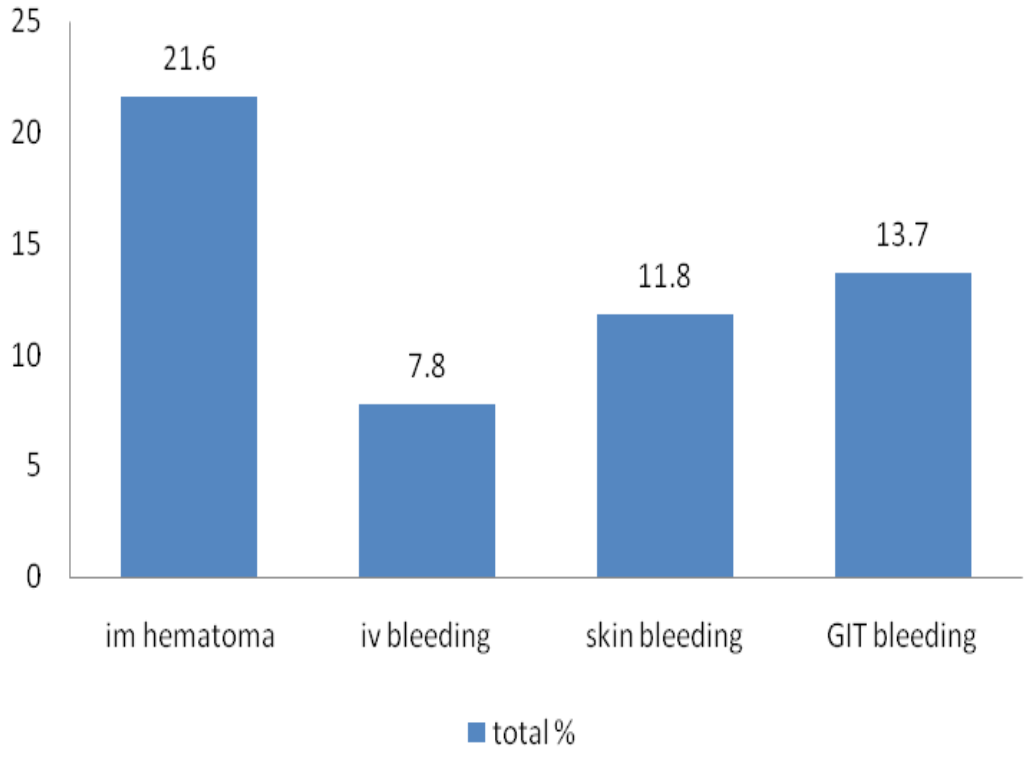
Symptoms

The commonest symptoms were incessant cry, refusal of feeds, posturing, seizures and vomiting.



Extra Cranial Bleeding

Intra cranial bleeding was suspected in these infants if they had extra cranial bleed in the form of i.m. site hematoma, prolonged i.v. site bleeding, GI or skin bleeds.



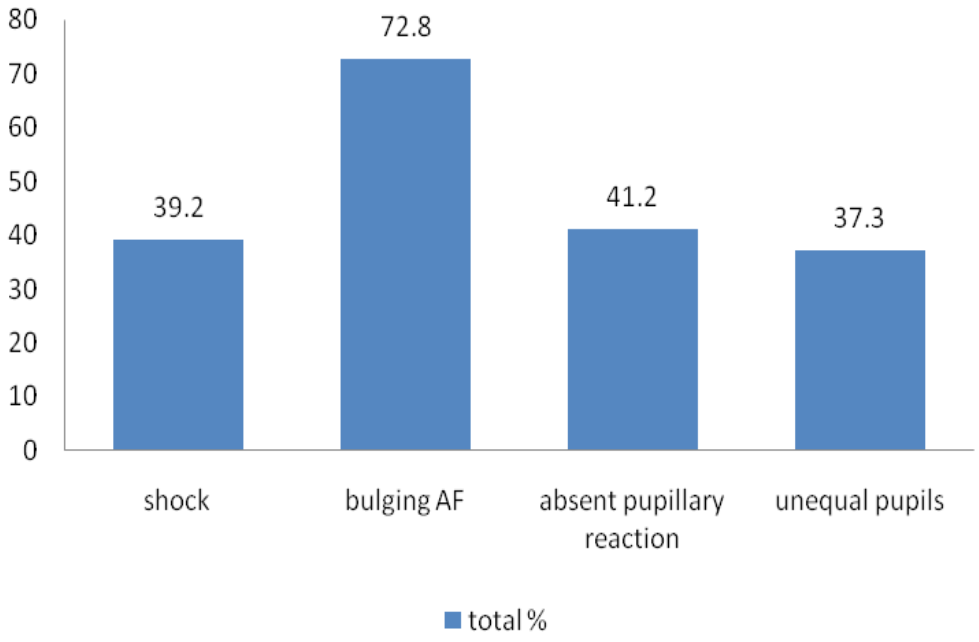
One child had late HDN who had preceding illness of diarrhea and had antibiotic treatment for the same.

Clinical features:

Anemia was severe in most of these infant.(mean 7.4 gm%)

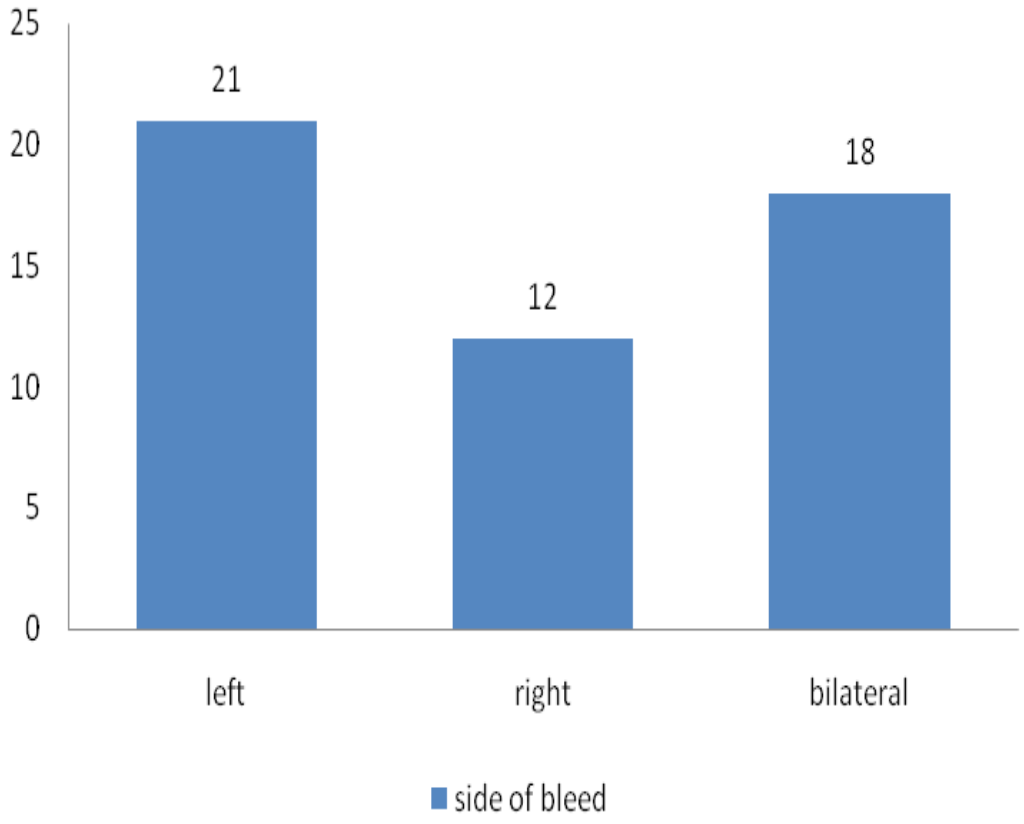
Hemorrhagic shock was present in 20 infants (39.2%)

Features suggestive of ICP(intra cranial pressure) in the form of bulging AF(72.8 %), unequal pupils(37.3 %), and sluggish pupillary reaction(41.2%).



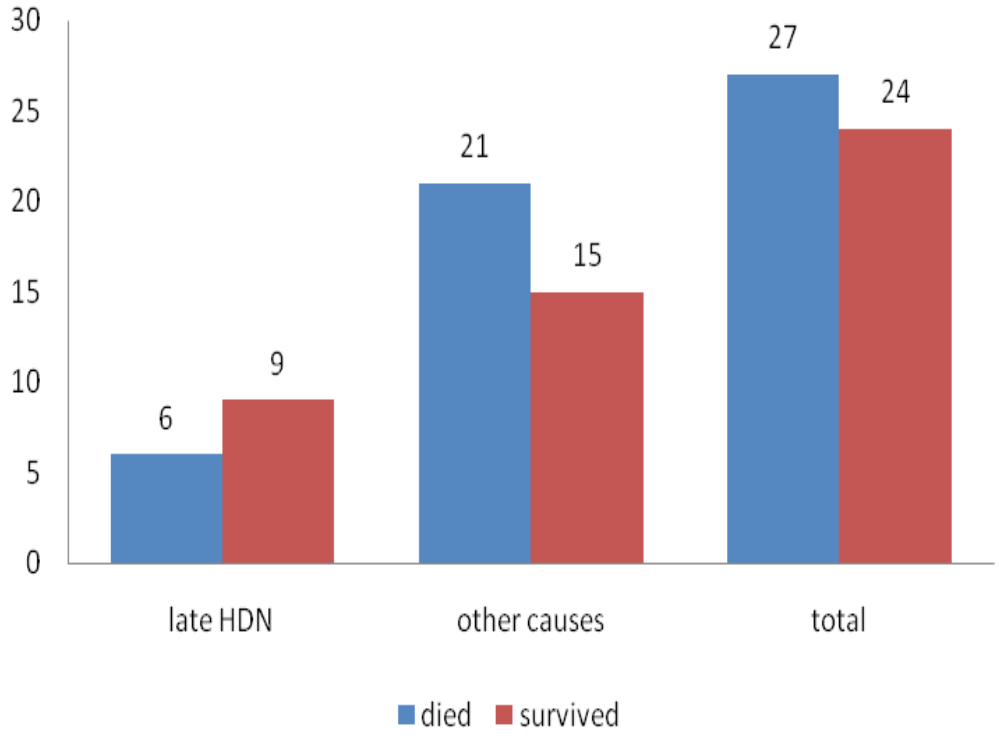
Side of bleeding

Left side of bleed was common than the right



Mortality:

Intracranial bleed had a high mortality(52.9%) of in this case series.



Among the etiological diagnosis, late HDN was the commonest -16 out of 51 cases, followed by neonatal cholestasis -8 cases. Among the late HDN, 15 were idiopathic and one case had preceding diarrhea and antibiotic usage.

Head injury accounted for 2 cases among the 51 cases. This may be an underestimate as cases of road traffic accident and others are directly admitted in Neurosurgery Dept, General Hospital before admission in our Institute.

Viral hemorrhagic fever accounted for 3 cases and Dengue hemorrhagic fever accounts for 1 case. Thrombocytopenia was responsible for intracranial bleed. Platelet count was less than 15000 in all these cases.

For 2 of the cases, the etiological work up was done on follow up. One was diagnosed as hypofibringenemia(prolonged PT and APTT, prolonged Thrombin Time and fibrinogen level 40mg%). Another child was diagnosed as dysfibrinogenemia (prolonged PT, APTT, TT and normal level of fibrinogen).

Interestingly one case was diagnosed as hemorrhagic meningoencephalitis. Fundus examination was hemorrhagic and lumbar puncture was blood stained in this child.MRI was suggestive of subdural bleed and hemorrhagic meningoencephalitis.

One child was diagnosed a s Hemophilia A on the basis of prolonged APTT, normal PT and factor VIII levels < 1%.

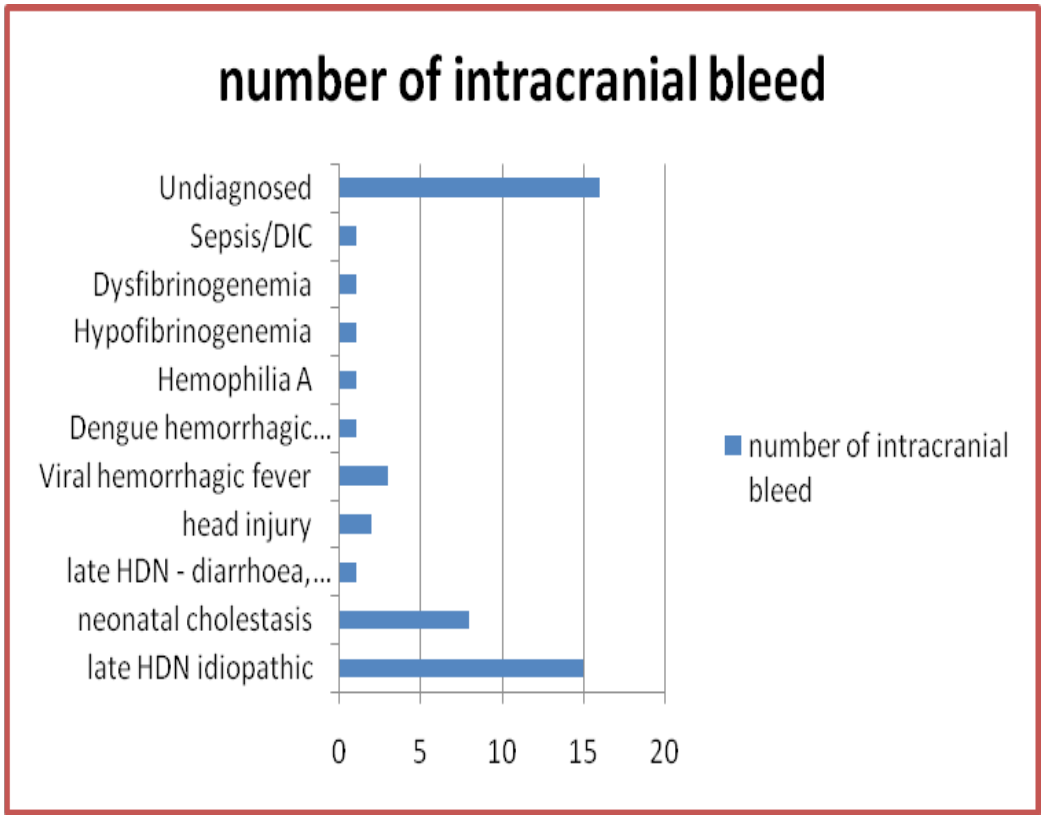
One child had evidence of sepsis and intra cranial bleed was due to DIC. This child had prolonged PT, APTT and low platelet count. Klebsiella was grown in the

culture.

In 16 cases, the etiological work up could not be done. Reasons were early administration of blood products outside, difficult to collect blood in child with severe anemia and shock and high mortality.

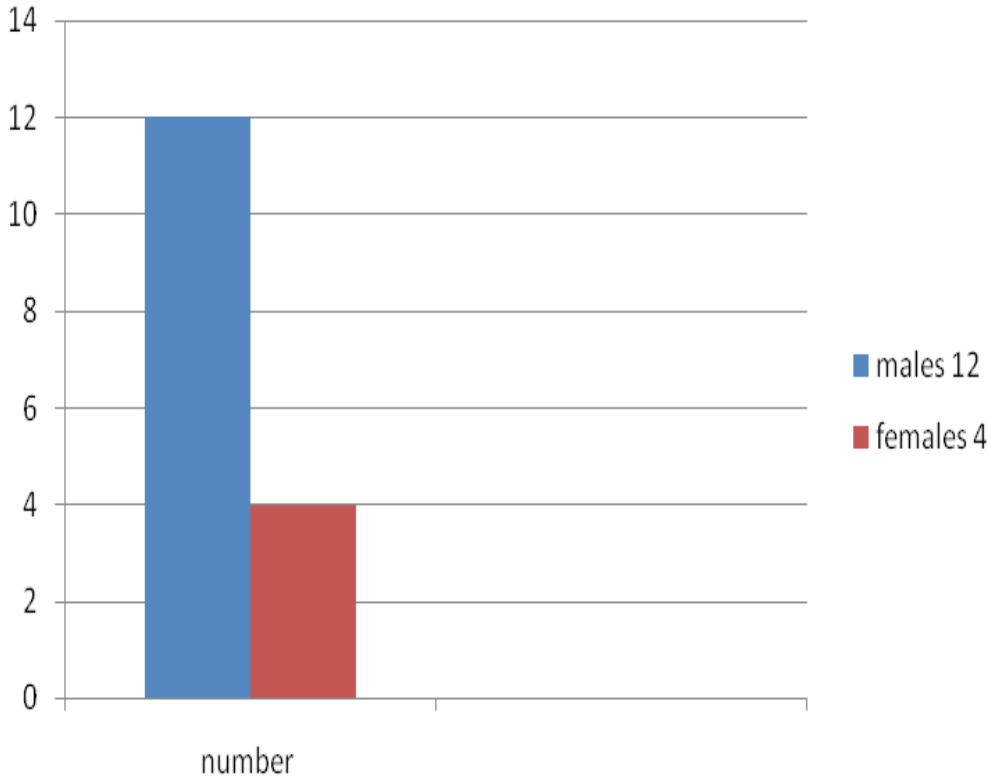
Late Hemorrhagic Disease of Newborn:

16 cases were diagnosed as late HDN out of 51 cases(31.3%).

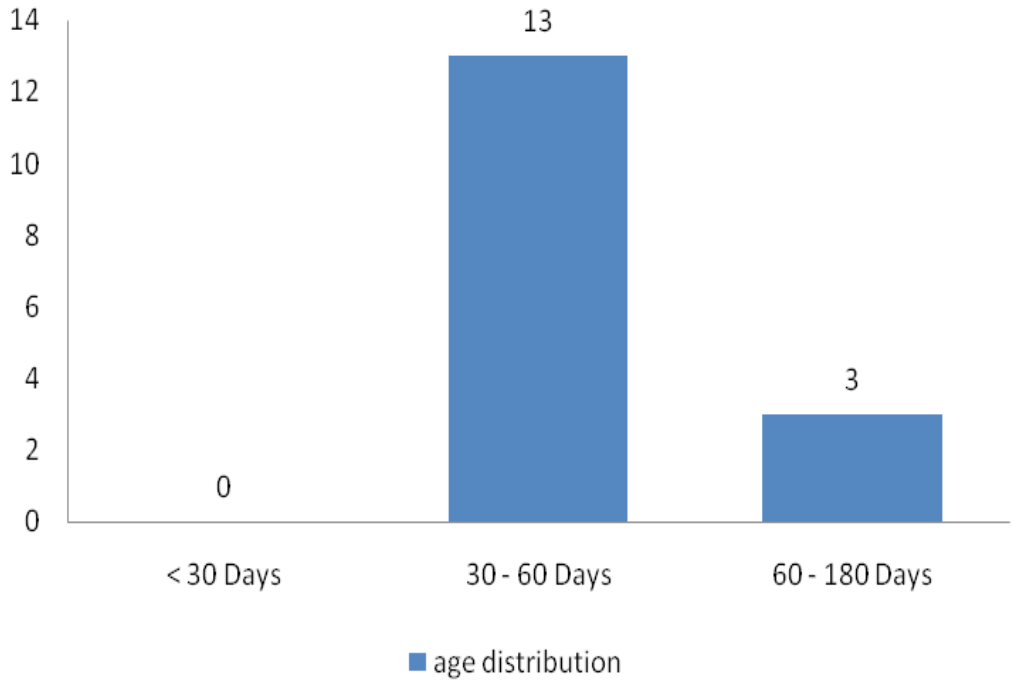


Sex:

Male sex outnumbered female sex in late HDN(75%).



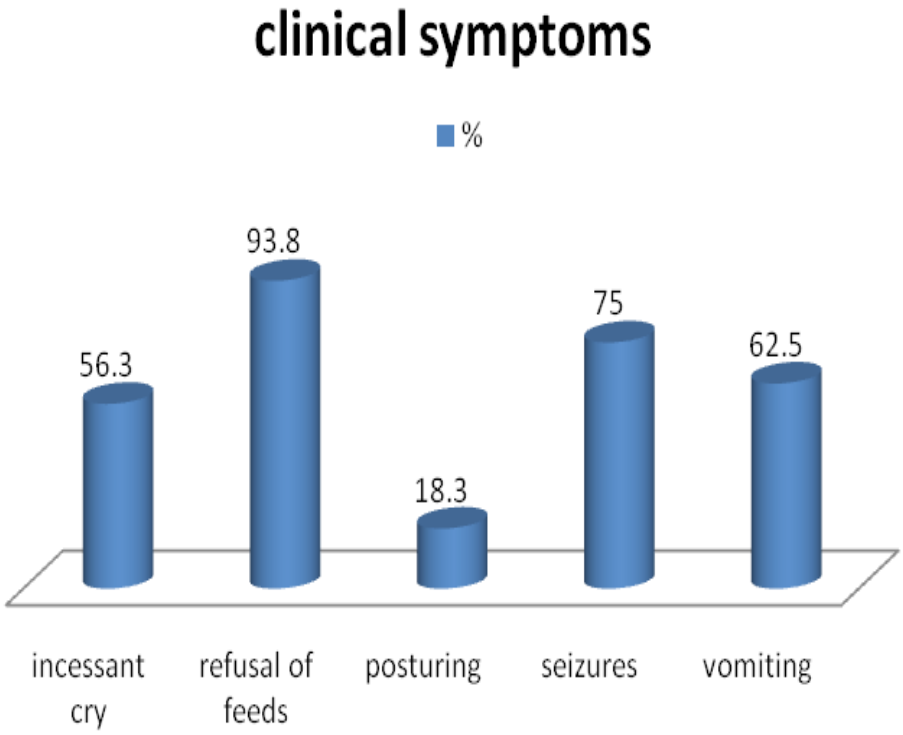
Age Group:



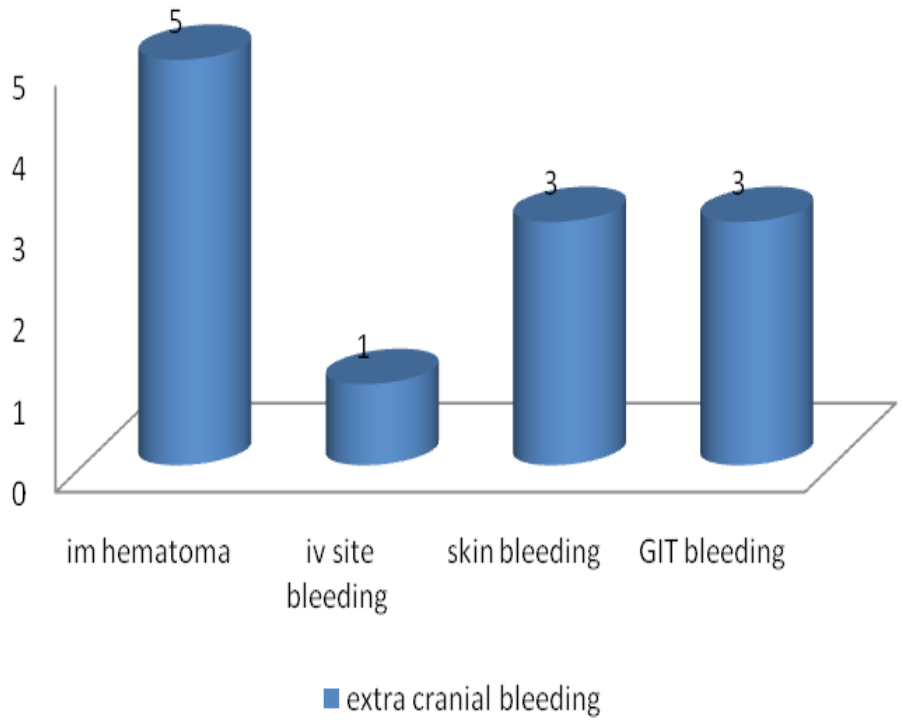
81% of the cases presented between 30 – 60 days.

CLINICAL SYMPTOMS:

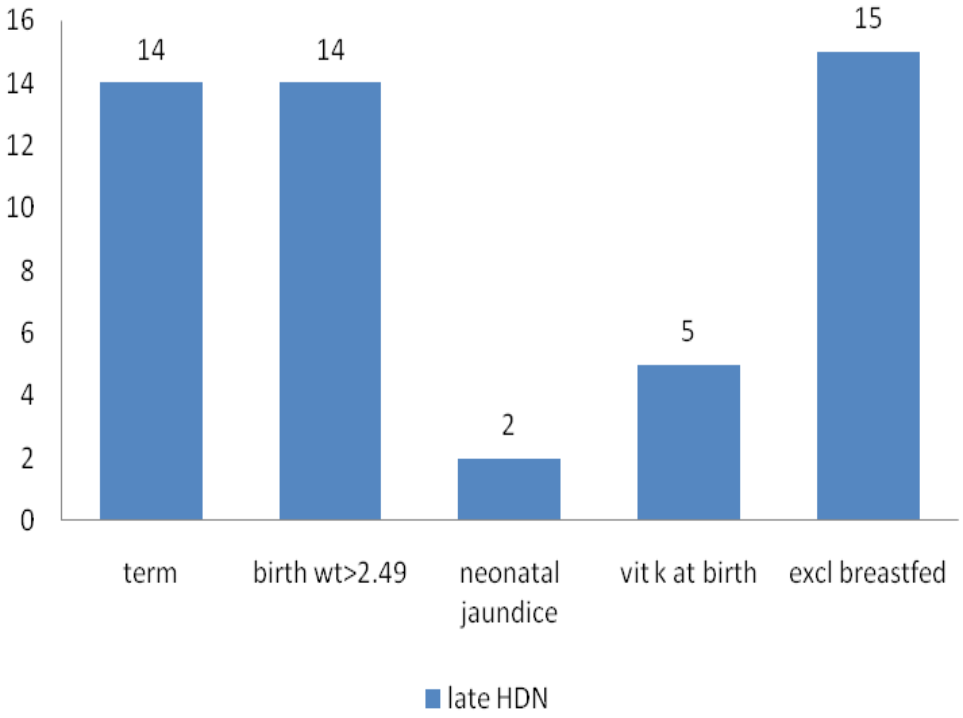
Symptoms such as incessant cry, refusal of feed, posturing, seizures and vomiting were in the following proportions.



Extra cranial bleeding:



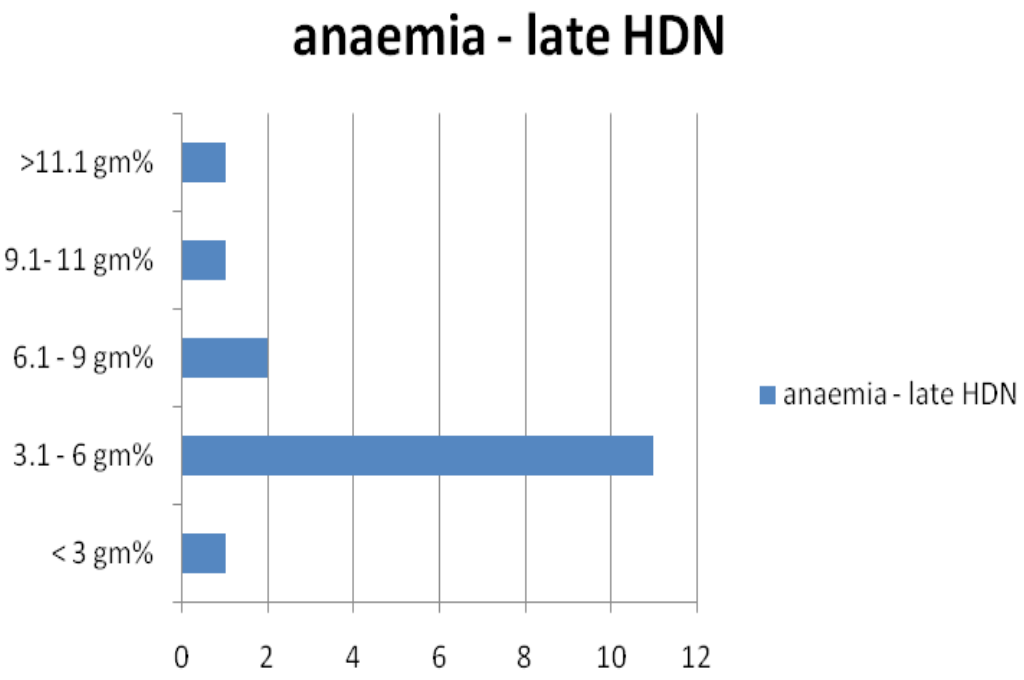
Exclusive breastfed infants(93.7%) and term(87.5%) were present in high proportion in late HDN.



Jaundice was seen in two of these infants were of unconjugated hyperbilirubinemia and their liver function tests are normal. Bilirubin was produced form the intra cranial bleed. Except one, all were exclusively breast fed.

Hb % :

Anemia was significant in these young infants as in all cases of intra cranial bleed. Most children had Hb % between 3.1 – 6 gm percent.

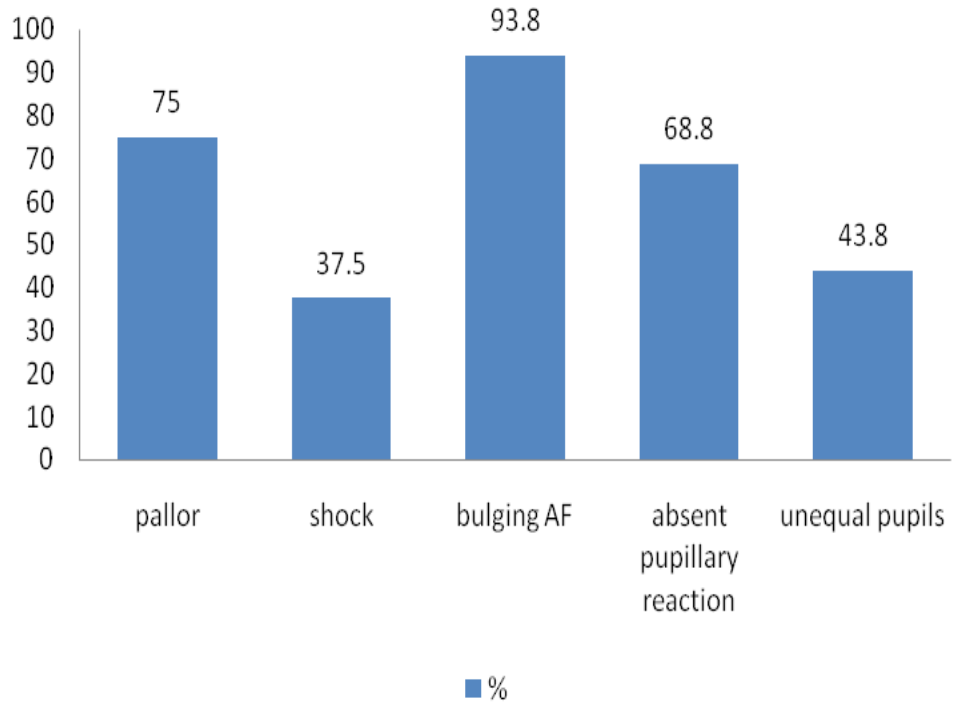


All these children had prolonged PT and APTT. Prothrombin time normalized with vitamin K. Since fresh frozen plasma was administered in most of these cases, repeat prothrombin time was taken just before the administration of blood products. The time interval between the two PT – before and after vitamin K varied from 2 hours to 24 hours. Prothrombin time normalized within 6 hours in some infants, in others it had significantly reduced in 2 hours almost approaching normal.

PT BEFORE AND AFTER VITAMIN K

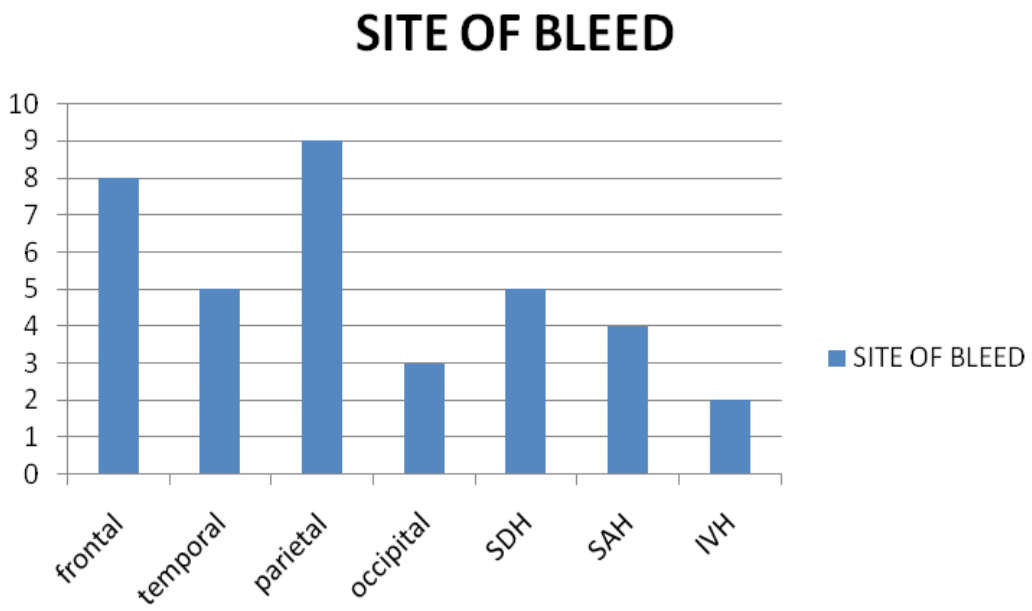
S. No	Initial PT sec	Time bet vit K & rpt PT hrs	Post vit K PT sec
1.	60	3	12
2.	60	4	11.9
3.	300	4	17.2
4.	300	2	26.2
5.	300	3	15.2
6.	300	2	28.2
7.	40	5	12
8.	300	5	19.2
9.	65.5	5	16.3
10.	300	6	20.6
11.	300	7	18.7
12.	221.9	5	24
13.	60	24	12
14.	300	6	19.2
15.	300	6	13.6
16.	97.8	6	17.6

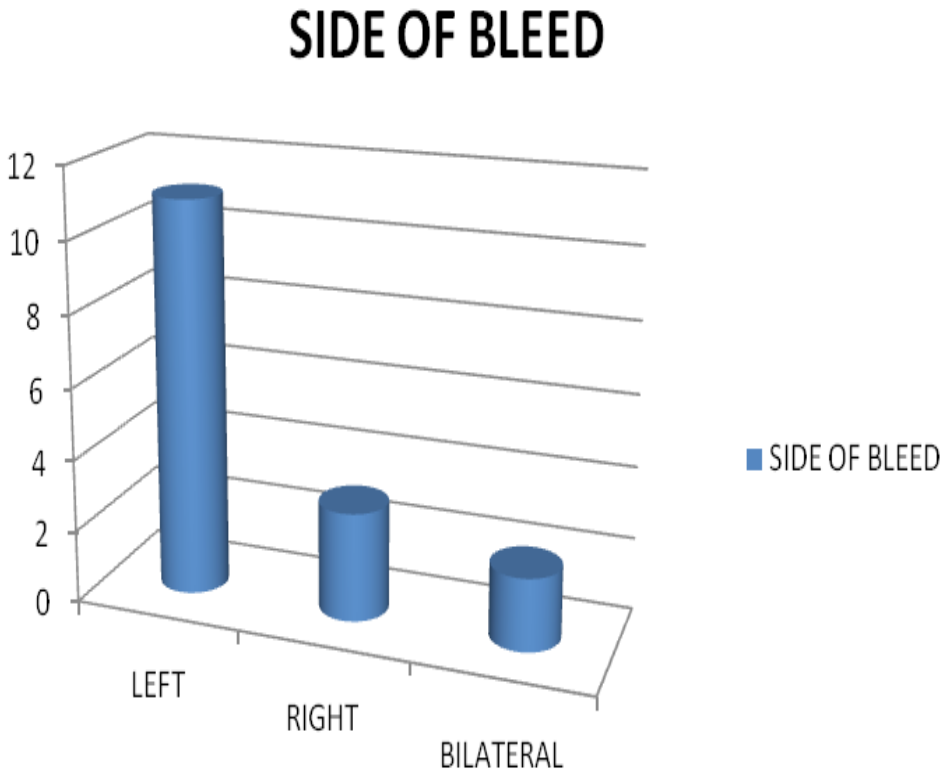
Clinical Features:



The pallor, shock, bulging AF, absent pupillary reaction and unequal pupils presented in the following proportions .

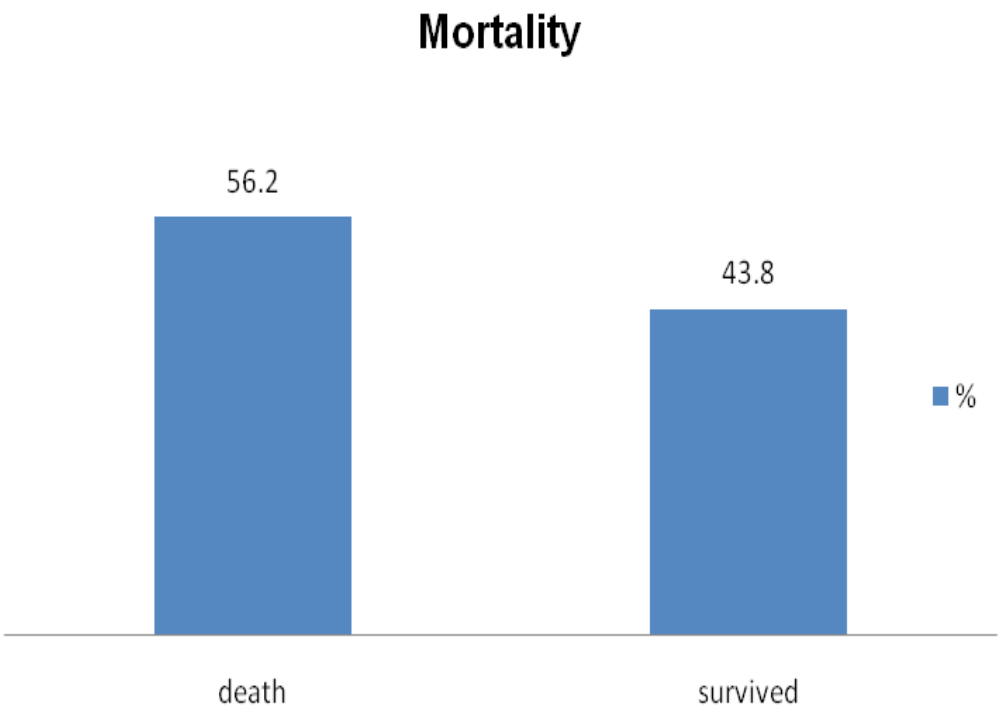
As in all intra cranial bleed, parietal bleed was the common site of intra cerebral bleed and left sided hemorrhage was common.




SIDE OF BLEED
12
10
8
6
4
2
0
LEFT
RIGHT
BILATERAL
SIDE OF BLEED

Outcome:

Mortality due to late HDN was 9 out of 16 cases (56.2%)



DISCUSSION

During the study period, total of 119 cases presented with intracranial bleeding in our INSTITUTE OF CHILD HEALTH, EGMORE from birth to 12 years.

51 cases(42.8 %) were in the age group of 2 weeks to 6 months(study period).

Late HDN –idiopathic type constituted 13.4 % (16 cases out of 119) of all cases of intra cranial bleeding in our institute.

Late HDN – idiopathic type constituted 31.3 %(16 cases out of 51) in the age group of 2 weeks to 6 months.

Neonatal cholestasis constituted 8 cases (15.6 %) of intra cranial bleed in the age group of 2 weeks to 6 months.

15 cases (29.4%) could not be diagnosed either due to early death or early administration of blood products.

The common age group affected by late HDN is 1-2 months. Sex ratio was 4:1(16: 4 cases).

The common presentations include incessant cry, posturing, vomiting, seizures and refusal of feeds.

Out of 51 cases of intra cranial bleeding in the study group, 4 cases had umbilical bleeding in the neonatal period though they presented with intracranial bleeding later. One infant presented at 180 days of life and diagnosed as Hypofibrinogenemia. Other infants presented at 30 – 45 days of life among which one infant turned out to be Dysfibrinogenemia on follow up. Other 4 siblings had late onset HDN.

One infant who was diagnosed as late HDN, had a sibling who had intra cranial bleed at 2 months of age. They were born of non consanguineous marriage. The cause of bleeding in that sibling was not evaluated as the sibling died, could be due to vitamin K deficiency itself.

Among 16 cases of late HDN, 14 were term with normal birth weight.

5 had received vitamin K at birth and 11 cases had not received vitamin K at birth. This is similar to the study done by Shirahata et al[8] and D'souza et al[7] that vitamin K at birth may not offer protection against late onset vitamin K deficiency.

Exclusive breastfeeding was practiced in 14 out of 15 cases of late HDN idiopathic. This is in concordance with Shirahata et al[8] and D'souza et al[7] that exclusive breast feeding is a risk factor for vitamin K deficiency.

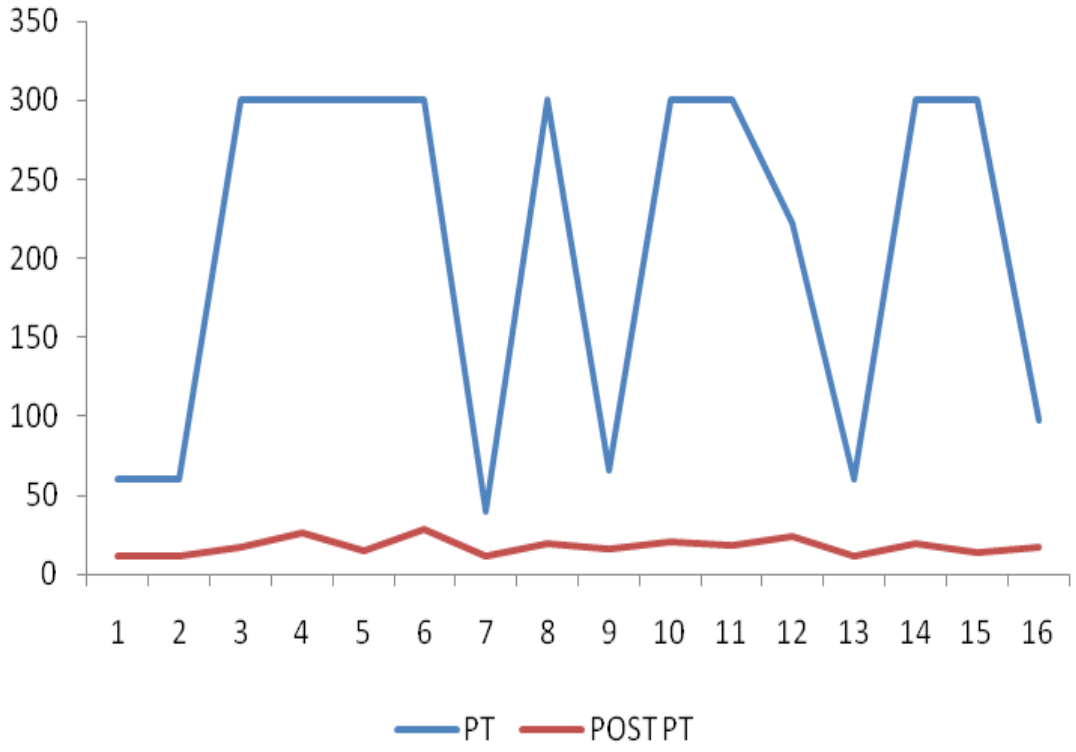
Clinical findings noted in these children were pallor, shock, bulging AF, unequal pupils, sluggish pupillary reaction and posturing.

DPT vaccination and Late HDN:

One interesting observation is that 4 of the cases of late HDN presented with intracranial bleeding one to three days after receiving DPT injection. It is probably due to the incessant cry that follows the DPT injection triggers intra cranial bleed. All these infants also had i.m. site hematoma suggesting that abnormal coagulation profile was present at the time of DPT vaccination.

Vitamin K administration & Prothrombin Time:

Vitamin K significantly corrected the abnormal coagulation profile as early as 2 hours. In our study, inj.vitamin K was given after taking blood sample for PT and APTT. PT was repeated after 6 hours of administration of vitamin K. However, in 10 cases PT was done before 6 hours as blood products and fresh frozen plasma had to administered. In view of life threatening emergency, PT was repeated before the administration of blood products as PT may be normalized with these blood products. The shortest time interval between the first PT and repeat PT was 2 hours. In 2 of the cases, PT was repeated after 2 hours of vitamin K and in both these cases the PT value had significantly reduced almost approaching normal.



Graphical representation of PT before and after vitamin K

Neonatal cholestasis constituted 8 cases out of 51 cases. Neonatal cholestasis was diagnosed on the basis of history, persistent conjugated hyperbilirubinemia, elevated liver function test and on follow up. In five of these cases, prolonged PT was corrected with vitamin K in single dose.

Other cases were already transfused outside and had normal PT and APTT on admission.

Most intra cranial hemorrhages were on left side and in parietal lobe. Late HDN had a mortality of 56 % - 9 died and 7 survived.

SUMMARY

1. Almost 50 % of intracranial bleed in our INSTITUTE occur <6 months of age excluding cases of head injury.

2. In the study population (2 weeks to 6 months), late onset HDN is the leading cause(31.3%) of intra cranial bleed and carries a high mortality

3. Most cases of late HDN occur in the age group of 1-2 months

4. Male sex, exclusive breastfeeding, diarrhea, prior antibiotic usage are all risk factors

5. Late HDN(31.3%) and neonatal cholestasis(15.6%) are the leading causes of intracranial hemorrhage in this age group

6. Vitamin K administration at birth may not protect against late onset HDN

7. Vitamin K significantly reduces the prothrombin time as early as 2 hours

8. Other causes of intracranial bleed in this age group in this study are hypofibrinogenemia, dysfibrinogenemia, hemophilia A, hemorrhagic meningoencephalitis, and head injury.

CONCLUSION

1. Late onset HDN usually presents as a life threatening problem of intracranial bleeding. It carries a high mortality.

2. Vitamin K deficiency in idiopathic Late onset HDN is transient. The deficiency manifests mainly in the age group of 1 -2 months.

3. Vitamin K reverses the prolonged PT within 2 hours.

4. Hematoma following DPT vaccination is warning sign of intra cranial bleeding

5. If hematoma occurs following any DPT or Hepatitis B vaccination, administration of vitamin K may prevent life threatening intra cranial bleeding

6. One must look for jaundice at the time of DPT or Hepatitis B vaccination on 45th day for early diagnosis of neonatal cholestasis and avoiding a life threatening intracranial bleeding

7. In view of rarity of this disorder, exclusive breastfeeding must still be continued. However unnecessary use of antibiotics which is another risk factor for vitamin K deficiency should be avoided

8. Vitamin K may be recommended in young infants on prolonged antibiotic treatment

Recommendations:

However recommending routine 2nd dose of vitamin K other than the dose at birth needs a cross sectional study to know the abnormal coagulation profile in exclusively breast fed normal infants and a multicentric prospective study to know it's prophylactic benefit.

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PROFORMA

CASE NO:

DOA:
DOD:

Name:
Age:
Sex:
Address:

IP no:
ward:
PICU:
NICU:

COMPLAINTS:

Skin	
GIT	
Nose	
joint	

Incessant cry

Irritability

Seizures

Poor sucking

Posturing

ALOC

Visible extra cranial bleed	gm%
Fever Vomiting Jaundice Breathlessness Trauma PAST HISTORY: Hospitalisation: h/o diarrhea h/o malabsorption h/o antibiotic use h/o cystic fibrosis h/o jaundice	

h/o bleeding tendency h/o hematoma during injections/DPT inj FAMILY HISTORY: h/o bleeding tendency in family members ANTENATAL HISTORY: maternal TB anti-TB drug intake maternal epilepsy anti-epileptic drug intake anti_coagulant intake h/o suggestive of TORCH INFECTION: medical disease: pregnancy related disease: BIRTH HISTORY: Mode of delivery: If LSCS/ forceps, indication: Admissions: Vitamin K given/ dose: EXCLUSIVE BREAST FEEDS: DEVELOPMENTAL HISTORY: IMMUNISATION HISTORY: EXAMINATION: GENERAL Nourishment. Sick looking Febrile Wt: Pallor Icterus Bleeding: ALOC: Shock: CVS: RS: ABDOMEN: Hepatomegaly: Liver span: Splenomegaly: CNS: ALOC	
Bulging fontanelle	
Absent papillary reaction	
Unequal pupils	
Posturing	
AVPU DEM	

Higher functions: Cranial nerves: Tone: Plantar: Other findings: INVESTIGATIONS BLOOD GROUPING: CBC: Hb	
TC	
DC	P L E
Platelet count	Lakhs/mm^3
Hct	%

	Incessant cry

OUTCOME: DIAGNOSIS:	

ANNEXURE (containing tables) **Table 1:** **INTRACRANIAL BLEED IS SUSPECTED WHEN BABY HAS THE FOLLOWING FEATURES** 1	
2	Seizures
3	Posturing

4	Refusal of feeds
5	Vomiting
6	Bleeding manifestations
7	Pallor
8	Bulging anterior fontanel
9	Unequal pupils
10	Sluggish pupillary reaction
11	Abnormal breathing pattern/apnea

Table 2:

Table 3:

Table 4:

ABBREVIATIONS

HDN	–	Hemorrhagic Disease of Newborn
VKDB	–	Vitamin K Deficiency Bleeding
PT	–	Prothrombin Time
APTT	–	Activated Partial Thromboplalstin Time
TT	–	Thrombin Time
DIC	–	Disseminatied Intravascular Coagulation